

# Retrieving and Unpacking USGS DLG/SDTS Data

## Tutorial and Users Manual

Version 1.2, March, 1998

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## 1. Introduction

One digital cartographic product of the U.S. Geological Survey (USGS) is vector data in the Spatial Data Transfer Standard (SDTS) format. The USGS distributes these data over the Internet as a means of promoting the standard. The SDTS is a relatively new and experimental format.

This document is a detailed explanation of procedures for downloading and unpacking USGS SDTS data. These data were created by reformatting digital line graph optional (DLG-O) data as SDTS. This conversion included adding metadata to each transfer, but did not include any update or other content changes to the spatial data.

This document is a companion to ***dlgv32 -- Windows 95 Display Software for DLG and DRG Data*** (users manual, software version 3.x), although the procedures described here may also be useful to users of other software. See

[http://mcmcweb.er.usgs.gov/viewers/dlg\\_view.html](http://mcmcweb.er.usgs.gov/viewers/dlg_view.html)  
for additional information about *dlgv32*.

## 2. Overview of DLG/SDTS Data

### 2.1 SDTS Overview

The Spatial Data Transfer Standard (SDTS) is a **standard**. Standards are documents that specify rules. They are neither software nor databases.

The SDTS is a standard for **data transfer**, as opposed to a standard for data processing. SDTS does not replace existing Geographic Information System (GIS) processing formats.

The SDTS is designed specifically for **spatial data**. Other standards exist for other kinds of data (digital images, documents, electronic signals, etc.).

The SDTS was designed by a collection of government agencies, universities, and private companies that saw a need for a better way to exchange GIS data. The National Mapping Division of the U.S. Geological Survey (USGS) is the maintenance agency for the standard.

The SDTS web site is:

<http://mcmcweb.er.usgs.gov/sdts>

### 2.2 Mass Conversion of DLG-O Data to SDTS

In 1995 the USGS began converting digital cartographic data holdings to SDTS.

The 1:2,000,000-scale DLG data were revised in 1995 and are now available in SDTS. This includes coverage of the conterminous United States for the following categories of data: hydrography, transportation, boundaries, United States Public Lands Survey System, and manmade features.

All 1:100K DLG files have been converted to SDTS format. This includes national coverage of the hydrography and transportation overlays, and less complete coverage of other layers.

All 1:24K DLG files have been converted to SDTS format. Coverage varies between overlays at this scale, but no overlay has complete coverage.

"All files" means all files for which DLG data have been produced. Coverage of 1:24,000 and 1:100,000 scale DLG data is not complete.

### 2.3 Sales and Distribution Policies

Most USGS data are neither online nor free. SDTS data are a significant exception to this policy. Other exceptions include 1:100,000 scale DLG-O and 1:250,000 scale DEM data.

Production, pricing and distribution policies for native DLG-O data have not changed due to availability of SDTS data. DLG-O data are still available from the same sources at the same prices as previously.

Because of data conversion problems, there are a small number of datasets that are available in native DLG-O format but not available in SDTS. There are no SDTS data sets that are not available in native format.

#### **2.4 DLG/SDTS data organization**

DLG-O data are derived from standard USGS topographic quadrangles. The packaging of DLG-O data reflects this: each physical file covers the geographic area of some part of a standard quadrangle, and contains a feature set that approximates one ink color of a standard published map.

Similarly, DLG/SDTS data are derived directly from DLG-O data, and reflect the DLG-O data packaging. Each SDTS transfer has the same geographic coverage and same spatial data content as the DLG-O it was derived from. This packaging is not dictated by the SDTS; the standard would allow (for example) all road and hydrography data for a county to be contained in one transfer, but reorganizing the data this way would have required a large and costly production operation, instead of a relatively simple data reformat.

A side effect is that the DLG/SDTS data appear more fragmented and complex than necessary. This is not a characteristic of the SDTS, but of policy decisions made when the USGS mass converted DLG-O data to SDTS format.

### **3. Summary of Data Retrieval Procedures**

DLG/SDTS data are held on an ftp site. The base address for the data is <ftp://edcftp.cr.usgs.gov/pub/data/DLG>

There are three sub-directories under this address, one for each of the three data scales:

- **2M** holds 1:2,000,000 scale data. The directory contains an SDTS master data dictionary for this scale, a readme file, and 50 subdirectories, one for each state.
- **100K** holds 1:100,000 scale data. The directory contains an SDTS master data dictionary for this scale, a readme file, and 26 subdirectories, one for each letter of the alphabet. Each of these subdirectories holds the 1:100,000 scale quadrangles whose names start with that letter.
- **LARGE\_SCALE** holds 1:24,000 scale data. The directory contains an SDTS master data dictionary for this scale, a readme file, and 26 subdirectories, one for each letter of the alphabet. Each of these subdirectories holds the 1:24,000 scale quadrangles whose names start with that letter.

Each data sub-directory in turn has several more levels of directories that reflect DLG overlays, data versions, and physical packaging.

The USGS GeoData web page, at

<http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/ndcdb.html>

provides a user interface to the ftp site. The web page provides several different "views" of the data, including lists by state, by name, and searching by graphic index. The Global Land Information System (GLIS), at

<http://edcwww.cr.usgs.gov/webglis>

provides another way to reach these data. GLIS provides relatively powerful data search tools.

All of these views eventually lead to the lowest level of the ftp directory structure.

An SDTS transfer is composed of multiple files. DLG/SDTS transfers have been combined into one physical file with the **tar** utility, and then compressed using **gzip**. See section 4.5 for details.

## **4. Detailed Instructions for Retrieving DLG/SDTS Data**

This section contains step-by-step instructions for retrieving, unpacking and organizing DLG/SDTS data. The Conifer, CO 1:24,000 quadrangle is used as an example. Procedures for the other scales are similar, but vary slightly because of different product characteristics.

This example shows how to find data using the **Query via graphics** capabilities of the GeoData web page. Users who know what they are looking for and know how to use ftp client software may wish to skip these procedures and go directly to the ftp site described in section 2.4. Reading sections 4.2 and 4.4 is strongly recommended before doing this.

### **4.1 Create Local Directory**

Create a directory (folder) on your local computer to hold downloaded files. For the purposes of this example, we will assume the directory is **c:\data\sdts\conifer** on a Windows 95 computer. If you plan to use multiple quadrangles, it is important to organize the data in a file structure that will help you keep track of all data. Create an additional subdirectory for each quadrangle.

An SDTS transfer typically contains many files. Keeping transfers separate by putting each quadrangle in its own directory is necessary because of the way the files within a DLG/SDTS transfer are named. Storing multiple quadrangles in one directory may result in file collisions.

### **4.2 Retrieve the Master Data Dictionary**

Each SDTS transfer is required to have a data dictionary. Because the DLG/SDTS data were created by reformatting DLG-O data, the same data dictionary can be used for all datasets. Rather than include this dictionary with each transfer, one data dictionary is stored for all transfers at the top of the ftp directory tree.

Go to [http://edcftp.cr.usgs.gov/pub/data/DLG/LARGE\\_SCALE](http://edcftp.cr.usgs.gov/pub/data/DLG/LARGE_SCALE) and retrieve the file **00MASTERDD\_LRG.SDTS.tar.gz**. This file must be unzip'd and untar'd like the other SDTS data. This will be explained in later sections. Placement of the data dictionary files may be software dependent. If using *dlgv32*, the files may be placed in

any directory on your hard drive, including the directory that holds the other SDTS data file. In this example, the directory would be c:\data\sds. If using ESRI Arc/Info, place the data dictionary files in the masterdd directory as specified by ESRI documentation.

#### **4.3 Find and Retrieve Data**

1. Go to the USGS GeoData page at  
<http://edcwww.cr.usgs.gov/doc/edchome/ndcddb/ndcddb.html>
2. Scroll down the page to **Large Scale Digital Line Graphs (DLG) - SDTS format only**.
3. Since the name of the quadrangle is known, the data could be found by selecting either **FTP via Alphabetical List** or **FTP via State**. However, it is common to not know exact quadrangle names:
  - Select **FTP via Graphics**.
  - Select **Conterminous 48 states**
  - A simple map of the U.S. appears. Click on the state of Colorado.
  - A map of Colorado appears, with 1-degree lines of latitude and longitude. Click near the center of the 1-degree cell immediately west of Denver and immediately south of Boulder. The next display will show approximately 30 7.5-minute quadrangles, centered on this mouse click.
  - Click on the 7.5-minute cell labeled **Conifer, CO**.
4. A "list" of one quadrangle appears. (Other paths to this page may produce lists of more quadrangles.) Select the link to **Conifer, CO**.
5. A list of nine directories appears. Each directory corresponds to one DLG overlay. Conifer is used in this example because all nine overlays are available. This is unusual for 1:24,000 scale data; most quadrangles do not have the complete set of overlays finished.
6. Select the second overlay, **hydrography**.
7. Select **version\_1**, the most recent version.
8. The file **D3910530\_hy0s.1.sds.tar.gz** contains the SDTS transfer for the hydrography layer of the Conifer, CO quadrangle. For an explanation of the file naming convention, see  
[http://edcftp.cr.usgs.gov/pub/data/DLG/LARGE\\_SCALE/00README](http://edcftp.cr.usgs.gov/pub/data/DLG/LARGE_SCALE/00README)  
Select the file **D3910530\_hy0s.1.sds.tar.gz** for download. Save it to the c:\data\sds\conifer folder. The file can be renamed (for example, conf\_hyd.tar.gz). Retaining the .tar.gz extensions is strongly recommended.

9. Repeat steps 6 through 8 for all overlays of interest.

#### **4.4 Transportation Overlay: A Special Case**

The transportation subdirectory contains three DLG/SDTS transfers: roads, railroads and miscellaneous transportation (airports, pipelines, etc).

DLG-O 1:24,000 scale sales units are packaged this way, and that packaging was retained in the SDTS version of the data: three separate SDTS transportation transfers were created for each quadrangle. This was a mistake, and requires a workaround by the end user. The data for these transfers must be kept in separate directories. Untaring two or more transportation transfers in the same directory will cause file collisions and loss of data.

If you intend to use more than one of these three transportation layers, create subdirectories for them. For example, c:\data\sdt\conifer\railroad. This step need not be done before downloading the data, but must be done before unzipping and untaring the data (section 4.5).

In 1:100,000 and 1:2,000,000 DLG data, the three transportation overlays are combined into one file, and therefore comprise only one SDTS transfer. Creation of additional transportation subdirectories is not necessary for these scales.

#### **4.5 Unzip and Untar**

The DLG/SDTS data were designed in 1994, before the release of Windows 95 and before most PC's were powerful enough to use GIS data. The data were designed for the scientific computers of the time, which were mostly UNIX workstations. The files in each SDTS transfer were combined into one file with the UNIX **tar** utility, and this combined file was then compressed using the **gnu-zip (gzip)** utility. This technique for combining and compressing files is common on UNIX.

Tar and gzip are not as common in the PC world, but a variety of freeware, shareware and commercial implementations of these utilities exist for all PC operating systems.

##### **4.5.1 WinZip**

One of the most common PC compression programs is the shareware program WinZip (<http://www.winzip.com>). WinZip will unzip and untar DLG/SDTS files if proper procedures are followed. These instructions are for WinZip 6.3 for Windows 95, using the WinZip Classic interface (as opposed to the Wizard; this is a user-selectable option in WinZip).

**1. *This first step is VERY IMPORTANT!***

Select **Options/configuration**. There is a checkbox labeled **TAR file smart CR/LF translation**. Insure that this box is *not* checked.

**2.** Select the **Open** icon from the tool bar. A popup window appears. In the "Types of files" subwindow, select **All Archives**. Navigate to the directory c:\data\sdt\conifer.

A list of the files downloaded from the USGS GeoData site should be visible. Select one of these files and click **Open**.

3. A window appears with the message **Archive contains one file...decompress it to a temporary folder and open it?** Select **Yes**.
4. A list of .ddf files should appear. These are the files contained in the SDTS transfer. Select all the files: click on the first file, then shift-click on the last file. Select **Extract** from the tool bar.
5. A popup window labeled "Extract" appears. Enter, or navigate to, the path and directory that you want to place the data into. The extracted files can be stored to the same directory as the compressed files, so enter (or navigate to) c:\data\sdts\conifer, then click the **Extract** button. This will unzip and untar the files.

Do not rename files extracted from the tar file. The files in an SDTS transfer are often referenced by name in other files of the transfer. Renaming .ddf files will break these relationships.

Once the data have been untar'd and unzip'd, the original .tar.gz files can be deleted.

#### 4.5.2 Other tar and zip utilities

Tar and gzip for DOS are available in the GNU utilities from the Free Software Foundation. Copies of these can be retrieved from

<ftp://ftpmcmc.er.usgs.gov/pub/sdts/software/tools/tar.exe>

<ftp://ftpmcmc.er.usgs.gov/pub/sdts/software/tools/gunzip.exe>

These must be run in a DOS window, using the following syntax:

to Unzip:      <path>\gunzip <filename>

to Untar:      <path>\tar xvf <filename>

where <path> is the path to the directory that contains the gunzip and tar executables.

## 5. Conclusions and Points of Contact

DLG/SDTS data are experimental. The design of these data could be improved, and will be improved for future data production. The data are useable in their current form if proper procedures are followed and appropriate software is available.

For more information about SDTS, see

<http://mcmcweb.er.usgs.gov/sdts>

to make comments or ask specific questions about SDTS or the USGS implementation of DLG/SDTS, send mail to

[sdts@usgs.gov](mailto:sdts@usgs.gov)

For information about *dlgv32*, USGS freeware for Windows 95 that will display DLG/SDTS data, see

<http://mcmcweb.er.usgs.gov/viewers>

## 6. Problems Downloading Data

Different brands and versions of web browsers implement anonymous ftp differently. The USGS has tested a number of browsers on the ftp site described in this paper, and believes that the data can be accessed through most browsers. However, the default browser configurations are not always correct for anonymous ftp access, and in some cases changing those configurations is somewhat difficult.

The USGS does not have the staff to provide tutorial support for commercial software. If you cannot access these data through your browser, we recommend either (1) studying your software documentation for anonymous ftp configuration procedures or (2) using an ftp utility instead of a browser.

Some sites where ftp utilities can be downloaded and purchased are:

<http://www.cuteftp.com>

<http://www.ftpx.com>

As an alternative, users that are using Win95 or WindowsNT can ftp data using the **Run** function on the **Start Menu**.

Type **ftp edcftp.cr.usgs.gov** and select OK.

Login: anonymous

Password: your e-mail address in the form *name@domain*

cd pub/data/DLG/LARGE\_SCALE/C/conifer\_CO

At this point the user is able to navigate to the layer to be downloaded.

To change the data transfer type to binary, type **binary**.

To specify which directory the data is to be downloaded to, type **lcd** *name of directory*.

To download the data, type **get** *name of file*.

To exit, type **quit**.